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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/031,120	04/23/2002	Jakob Nielsen	66722-012-7	3828

25269 7590 11/02/2006

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EXAMINER	
KURR, JASON RICHARD	
ART UNIT	PAPER NUMBER
2615	

DATE MAILED: 11/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No.	Applicant(s)
	10/031,120	NIELSEN ET AL.
	Examiner	**Art Unit**
	Jason R. Kurr	2615

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 August 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Engebretson (US 5,475,759) in view of Hansen (US 5,680,467) and in further view of Gao et al (US 6,876,751 B1).

With respect to claim 1, Engebretson discloses a method for canceling feedback in an acoustic system comprising a microphone (fig.4 #101), a signal path (fig.4 #105), a speaker (fig.3 #17), and first feedback cancellation filter means (fig.4 #113) for compensating at least partly a possible feedback signal (col.8 ln.24-28), the method comprising: using a LMS algorithm for generating filter coefficients (col.9 ln.14-24); using an a second feedback cancellation filter (fig.4 #109) and a noise generator (fig.4 #115) for providing low-frequency input for the LMS algorithm (col.8 ln.38-52, col.10 ln.10-17).

Engebretson does not disclose expressly means for detecting presence of feedback between the speaker and the microphone.

Hansen discloses means for detecting presence of feedback between the speaker and the microphone (fig.2 #31).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the feedback detection means of Hansen in the invention of Engebretson.

The motivation for doing so would have been to detect changes in the feedback path thus allowing the hearing aid to compensate for these changes by adjusting the speed at which the feedback cancellation filter's coefficients are updated. This would allow the hearing aid to adjust precisely according to environmental changes without inconveniencing the user of the hearing aid as taught by Hansen (col.1 ln.43-55).

Engebretson does not disclose expressly using a highpass filter to prevent low-frequency signals from entering the LMS algorithm.

Gao discloses a method of adaptively canceling acoustic feedback wherein a highpass filter (fig.6 "BPF1") prevents low frequency signals from entering an LMS algorithm (col.5 ln.36-58)(col.7 ln.12-17).

At the time of the invention it would have been obvious to use the high pass filter of Gao in the invention of Engebretson.

The motivation for doing so would have been to pass signals in the frequency region containing all the unstable feedback frequencies. This would minimize distortion from the adaptive filter as taught by Gao (col.1 ln.52-59).

Gao does not disclose expressly wherein the filter (fig.6 "BPF1") is strictly a highpass filter, however it is known to those of ordinary skill in the art, that a bandpass filter is made up of a cascaded highpass filter with a lowpass filter.

With respect to claim 2, Engebretson discloses a method according to claim 1, however does not disclose expressly where a Schroeder noise generator is used for generating a broad band noise signal having an amplitude substantially equal to the amplitude of the signal from which it was derived.

Official Notice is taken that the concept and advantages of using a Schroeder noise generator to provide a noise signal are well known in the art. It would have been obvious to use a Schroeder noise generator as the noise generator of Engebretson. The motivation for doing so would have been to provide the system with a stable noise signal that is highly predictable.

With respect to claim 3, Engebretson discloses a method according to claim 2 where a steep low pass filter (fig.3 #59) is used to generate a low frequency noise signal to be used as an additional input to the LMS algorithm.

With respect to claim 4, Engebretson discloses a method according to claim 1 in view of Hansen, where the LMS algorithm operates with a predetermined essentially level independent adaptation speed when feedback is not present, this representing a first mode (Hansen: col.8 ln.16-20), where the LMS algorithm operates at a level

dependant adaptation speed when feedback is present, this representing a second mode (Hansen: col.7 ln.42-65); where the means for detecting the presence of feedback is used to control the adaptation mode selection of the LMS algorithm (Hansen: col.4 ln.52-67); and where the adaptation speed for the LMS algorithm is determined by a long-term average of a denominator in the LMS update algorithm in the second mode (Hansen: col.7 ln.45-49, col.8 ln.1-20).

With respect to claim 5, Engebretson discloses a method according to claim 4 in view of Hansen and Gao, comprising a microphone (Engebretson: fig.4 #101), a signal path (Engebretson: fig.4 #105), a speaker (Engebretson: fig.3 #17), means for detecting presence of feedback between the speaker and the microphone (Hansen: fig.2 #31) and filter means (Engebretson: fig.4 #113) for at least partly compensating a possible feedback signal, the method comprising: using a bandwidth detection means for determining the presence of a feedback signal. Hansen does not disclose expressly wherein the feedback detection means (Hansen: fig.2 #31) detects the band width of the feedback signal, however, the combination of Gao and Engebretson as suggested in the rejection of claim 1, would include the bandpass filter of Gao (fig.6 "BPF1") in the feedback path of Engebretson. Hence, providing detection means of the bandwidth of the feedback signal. The motivation for using the bandwidth detection means (Gao: fig.6 "BPF1") of Gao would have been to pass signals in the frequency region containing all the unstable feedback frequencies. This would minimize distortion from the adaptive filter as taught by Gao (col.1 ln.52-59).

With respect to claim 6, Engebretson discloses a method according to claim 5 in view of Hansen, where the stability of the signal determined as the feedback signal is analyzed (Hansen: col.7 ln.37-44).

With respect to claim 7, Engebretson discloses a method according to claim 6 in view of Hansen, where the feedback analyzing comprises holding flag values from a number of succeeding time frames and comparing of these (Hansen: col.7 ln.11-37).

With respect to claim 8, Engebretson discloses a hearing aid comprising: a microphone (fig.4 #101); a signal path (fig.4 #105); an amplifier (fig.3 #67, col.7 ln.32-33); a speaker (fig.3 #17); first feedback cancellation filter means for at least partly compensating a possible feedback signal (fig.4 #113); memory means (fig.5 #49) including a LMS algorithm for generating filter coefficients (col.11 ln.60-64); and second feedback cancellation filter means (fig.4 #109) and a noise generator (fig.4 #115) for providing low-frequency input for the LMS algorithm (col.10 ln.10-17, col.8 ln.38-52).

Engebretson does not disclose expressly means for detecting presence of feedback between the speaker and the microphone.

Hansen discloses means for detecting presence of feedback between the speaker and the microphone (fig.2 #31).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the feedback detection means of Hansen in the invention of Engebretson.

The motivation for doing so would have been to detect changes in the feedback path thus allowing the hearing aid to compensate for these changes by adjusting the speed at which the feedback cancellation filter's coefficients are updated. This would allow the hearing aid to adjust precisely according to environmental changes without inconveniencing the user of the hearing aid as taught by Hansen (col.1 ln.43-55).

Engebretson does not disclose expressly using a highpass filter to prevent low-frequency signals from entering the LMS algorithm.

Gao discloses a method of adaptively canceling acoustic feedback wherein a highpass filter (fig.6 "BPF1") prevents low frequency signals from entering an LMS algorithm (col.5 ln.36-58)(col.7 ln.12-17).

At the time of the invention it would have been obvious to use the high pass filter of Gao in the invention of Engebretson.

The motivation for doing so would have been to pass signals in the frequency region containing all the unstable feedback frequencies. This would minimize distortion from the adaptive filter as taught by Gao (col.1 ln.52-59).

Gao does not disclose expressly wherein the filter (fig.6 "BPF1") is strictly a highpass filter, however it is known to those of ordinary skill in the art, that a bandpass filter is made up of a cascaded highpass filter with a lowpass filter.

With respect to claim 9, Engebretson discloses a hearing aid according to claim 8, further comprising steep low pass filters (fig.3 #59) for generating a low-frequency noise signal to be used as an additional input to the LMS algorithm.

Response to Arguments

Applicant's arguments filed August 9, 2006 have been fully considered but they are not persuasive.

With respect to Applicant's arguments on pages 6 and 7 of the Remarks in regards to claim 1, it is stated that Engebretson does not disclose, "using an additional feedback cancellation filter and a noise generator for providing low frequency input for the LMS algorithm". Engebretson discloses that the cited filter "additional filter" (fig.4 #109) is used for adaptively varying the coefficients of the cited feedback cancellation filter (fig.4 #113) as a function of the combined signal input so that the adaptive output substantially offsets the feedback contribution in the electrical output of the microphone (col.10 ln.10-17), hence the filter (fig.4 #409) is in addition to feedback cancellation filter (fig.4 #113) and thus aids in the cancellation of feedback. Engebretson clearly discloses the use of a noise generator (fig.4 #115) that provides an input to the additional feedback cancellation filter (fig.4 #109) through signal path figure 4, #115-111-113-107-109. It is well known in the art that noise generators are capable of supplying a broadband noise signal to a system. Broadband signals contain both low and high frequency components, therefore it is implied that the noise generator of

Engebretson supplies the additional feedback cancellation filter with a low frequency signal.

This Examiner would like to note that the arguments in regards to claim 8 would be the same as presented above.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason R. Kurr whose telephone number is (571) 272-0552. The examiner can normally be reached on M-F 10:00am to 6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on (571) 273-8300. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JK
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